

REMARKS

Claims 4-30, 33-40, and 53 have been previously withdrawn and cancelled from the present application. The claims remaining in the application are 1-3, 31, 32, and 41-51.

Rejection Under 35 U.S.C. § 112

The Office Action has rejected claim 2 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This rejection is respectfully traversed.

Rejection Under 35 U.S.C. § 103

The Office Action has rejected claims 1, 3, 31, 32, 43, 46-48, and 51 under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al. (U.S. 4,966,804) in view of Askeland et al. (U.S. 6,443,568) in view of Schwarte et al. (U.S. 5,747,166). This rejection is respectfully traversed.

The Office Action has rejected claim 2 under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al. (U.S. 4,966,804) in view of Askeland et al. (U.S. 6,443,568) in view of Schwarte (U.S. 5,747,166) in further view of Patterson et al. (U.S. 4,732,786). This rejection is respectfully traversed.

The Office Action has rejected claims 41 and 42 under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al. (U.S. 4,966,804) in view of Askeland et al. (U.S. 6,443,568) in further view of Schwarte (U.S. 5,747,166) in further view of Uerz et al. (U.S. 7,219,989). This rejection is respectfully traversed.

The Office Action has rejected claims 44 and 49 under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al. (U.S. 4,966,804) in view of Askeland et al. (U.S. 6,443,568) in further view of Schwarte (U.S. 5,747,166) in further view of Yang (U.S. 5,594,044). This rejection is respectfully traversed.

The Office Action has rejected claim 50 under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al. (U.S. 4,966,804) in view of Askeland et al. (U.S. 6,443,568) in further view of Schwarte (U.S. 5,747,166) in further view of Irihara et al. (U.S. 6,428,143). This rejection is respectfully traversed.

The Office Action has rejected the present application using wording identical to that used in the first Office Action in the Final Office Action, except that the Schwarte et al. patent is added. The Office Action states that the final rejection is in response to claim amendments.

The Schwarte et al. patent is not applicable in that the coatings claimed contain blocked isocyanates that on baking decompose and react with other ingredients of the coating. This is in contrast to the claims of the present invention in that coating solution in the present invention does not contain a reactive species.

U.S. Patent No. 5,747,166, Schwarte et al., has a clearly stated objective of reducing "popping." This is stated at column 1, lines 35-45, and in claim 1, and implied in every claim of the patent. This problem is not expressed in the present application and one skilled in the art would not look to this reference for such a solution.

The application of the coatings is clarified in column 10 of Schwarte et al. to show either two coats or a one finish coat. For a single layer coating, the layer would be pigmented, with pigments including carbon black or iron oxide. For a two-layer finish the layer would be transparent. In either case the single coat is baked (lines 30-32) or the two coats are applied and baked together (lines 33-34). Column 7, lines 33-43 explains that the blocked isocyanate materials are essential ingredients for the invention and are cross-linking agents that are active when the material is baked. Column 8, line 80 explains that the blocked polyisocyanates should not undergo any chemical reaction with other coating constituents before the start of the baking process, but should have reacted with the isocyanate-reactive binders as completely as possible when the baking process has ended. The blocked isocyanides constitute reactive species and therefore would be inconsistent with the revised claims of the present invention. Any inclusion of a pigment such as carbon black in coatings of the present invention would make them entirely unsuitable because it would be impossible to see any ink jet image printed on the layer.

Polyisocyanate or a mixture of blocked polyisocyanates are essential ingredients of every claim and of the entire Schwarte et al. patent. See column 1, lines 47 and 48, and all of the claims. There is no such ingredients in the coatings of the present invention. See also claim 1, column 12, line 53 of

Schwarte et al. "...wherein the popping limit is improved by adding a blocked polyisocyanate to the coating..." Anyone skilled in the art would read that the improved qualities of the Schwarte et al. invention is the inclusion of these materials which are not part of the present invention.

Page 10 of the present application describes the hydrophobic polymer used as stabilized to a pH of 7 or less. This is not the same as the range of 6.5 to 9 of Schwarte et al. This is significant since the Schwarte et al. range would, in general, cause precipitation in coating solutions according to the present invention, and one skilled in the art would not choose to try to apply Schwarte et al. to the present invention. See column 3, lines 19-24, "However, it is preferable for the carboxyl content to be kept as low as possible... Components... that are free from carboxyl groups are particularly preferably employed." The present invention uses polyacrylic acid with no restriction on carboxyl groups and no treatment to limit the carboxyl group content as described in Schwarte et al. Although column 4, line 37 has polyacrylic acid as the preferred polymer the pH is preferably kept around 8.5 (column 3, line 39) and the polymer is complexed with a polyvalent metal cation (column 3, line 11 and column 2, line 66 onwards). This is a water insoluble absorbent (column 3, line 13). The polyacrylic acid of Schwarte et al. does not exist as such in the coating. In fact, it can be pre-mixed with the metal to form the insoluble complex before coating. See column 3, lines 4-6.

There is no indication in Schwarte et al. that the coat would absorb an ink jet image as required by the present application. Indeed the essential ingredient of isocyanates does not appear in the present application and thus there is no indication that the resulting formulation of Schwarte et al. would absorb the ink jet images of the present invention formulations. As explained in U.S. Patent No. 4,732,786 (Patterson) column 1, lines 9 and 10, "Coatings for ink jet printing must provide a surface that is receptive to the inks used in the process." Anyone skilled in the art would be seeking coatings that would have an indication that they would be useful in this respect. Schwarte et al. is silent on this point.

In summary, one skilled in the art would learn from the Schwarte et al. patent that suitable water based automotive coatings can be formed by metal complexes of hydrophilic polymers which are cross-linked using blocked

isocyanides by baking after coating. The present invention does not have metal complexing, nor blocked isocyanates, nor cross-linking by baking after coating.

Comments noted in the previous amendments are incorporated below for the Examiner's convenience.

Hasegawa et al. is concerned with water impervious surfaces that are coated with water absorptive layers and then imaged with ink jet inks. The "coating layer.... is made from a composition comprising a highly water-absorptive resinous polymer with optional admixture of an inorganic porous powder". See column 2 line 30. These resins are described in column 3 line 31 to 39. They are not the same as in the present application, see page 11 of the specification. Hasegawa et al are solving a different problem by a different method. See column 1 line 67. "Since the coloring material or dye contained in the aqueous ink and deposited on and absorbed by the above mentioned coating layer of the water absorptive particulate material is soluble in water, drawbacks of spreading and blur may sometimes be caused in the printed images on such a recording sheet to decrease or lose the legibility of the recorded images when the printed material is brought into contact with water or prolongedly kept under adverse conditions of high temperature....."

Under SUMMARY OF THE INVENTION Hasegawa states "The present invention accordingly has an object to provide a highly water-resistant printed material freed from the above described problems and disadvantages.....as well as to provide a method for preparation of such water resistant printed material."

The present application does not relate to spreading and blur of the printed image as it is not confined to the coloring material that is soluble in water. Examples in the present application use a C82 Epson printer that works with pigment based ink jet inks which are insoluble in water. Page 10 line 14 of the present application states "Aqueous ink jet inks may be based on dye colorants or pigments and may contain technologies to enhance drying and wet strength."

In addition, Hasegawa is primarily concerned with improving water resistance and does not mention chemical resistance at all. Water resistance is tested for in his Examples and there is one mention of mechanical strength at

the end of Example 6. Hasegawa is silent on chemical resistance as described in the present application, page 13 lines 1 to 6.

In section 7, the Examiner says that Hasegawa discloses overcoating the surface with a water-based coating in columns 3-4 lines 56-17, however, no reference to aqueous coatings could be found. The Examiner may be concluding that when the patent states that the polyisocyanate is preferably in the form of an organic solution it is only a preference and implies that water can be used. But it may be implying that as these polyisocyanates are generally liquids they can be coated without solvent. Polyisocyanates generally are unstable in water and therefore would not be used unless specially blocked which is not indicated here. The use of organic solvent is diametrically opposed to the present application, which, on page 11, line 22, and subsequent paragraphs, specifically teaches away from using organic solvents.

Whereas the present application is confined to undercoats which do not contain reactive species, there is no indication of this requirement by Hasegawa, see column 3, lines 31-45 which includes crosslinked copolymers of isobutylene and maleic anhydride.

In summary, Hasegawa is distinct from the present application because it:

- i. Only seeks to solve spreading and blur of image caused by using water-soluble colorants and to give water resistance to the finished printed material.
- ii. Only seeks to use polyisocyanates as a means of doing this.
- iii. Does not have water based coatings.
- iv. Does not claim chemical resistance.
- v. Does not seek to avoid the use of volatile organic compounds.
- vi. Does not seek to avoid reactive species in the undercoat.

Askeland et al. relates to speeding up ink jet ink drying while avoiding ink spreading. This is done by applying a reactive fixer liquid either before or after ink jetting to precipitate out the colorant, see the Abstract. The process for use with paper and no mention of plastic is made. See column 1 lines 5 -15, 32 -35, 58-60, column 3 lines 38-44, column 4 line 7, and column 4 line 24.

The fixer is confined to the zone where the ink jet ink is printed and contains a reactive material. This is called "Underprinting" in the patent and is defined at column 1 line 38. "Underprinting is defined as applying a transparent liquid on paper just before applying inks."

The Examiner identifies the undercoating of Hasegawa with the fixer liquid of Askeland. However, the fixer liquid is clear and has to penetrate the media, see column 3 lines 27-28. Furthermore, the heating of the fixer before ink jetting to avoid bumps is confined to the print zone, column 3 line 58 Askeland.

Thus the combination of Askeland together with Hasegawa would not yield the limitations of the invention for the following reasons:

- i. The Askeland fixer contains reactive ingredients, and the layer of the present invention does not.
- ii. The Askeland material is only located in ink zones, and the layer of the present invention is not.
- iii. The Askeland fixer is for paper surfaces, and the layer of the present invention is for films.

The Examiner states that the motivation to combine the patents would be to get rid of bumps on the ink surface. However, this was only a problem in Askeland where ink/fixer precipitates occur, column 3 line 52, and not a problem of Hasegawa which does not have ink/fixer precipitation. Thus, Askeland does not fill in the gaps between Hasegawa and the present invention as discussed above.

The Office Action has rejected claim 2 under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al. (U.S. 4,966,804) in view of Askeland et al. (U.S. 6,443,568) in further view of Patterson et al. (U.S. 4,732,786). This rejection is respectfully traversed.

Patterson et al introduces insolublized polymers into a hydrophilic polymer composition see column 1 lines 29-34. In this patent it is stated that "stronger surfaces can be made which will be able to withstand the problems associated with printing processes, such as offset printing..." Contrast this with the present application, page 8 line 20, which states, "In the present application such coatings, while having characteristics of a solid film, may have poor adhesion to the substrate and poor water resistance and may be easily damaged if

the surface contacts another surface or is handled in any way, until after imaging and lacquering when excellent physical and chemical adhesion can be achieved."

In the Summary of Invention of the present invention, the first sentence reads, "The present invention describes single coatings onto non-absorbent substrates on which aqueous ink jet inks are jetted with subsequent application of heat, without the use of reactive species in the ink and in the media used as a substrate coating." In Patterson, column 2 line 66, "According to the instant invention, a hydrophilic polymer is incorporated into the coating formulations. The polymer is insolubilized in situ through the use of a polyvalent metal cation, or by other means, such as covalent cross-linking or electron beam curing. The patent has many references to cross-linking. Therefore using the undercoat of Patterson as suggested by the Examiner, see page 7 section 8 of the rejection, would not produce the same results as the present invention because Patterson's hydrophilic –hydrophobic binders, column 4 line 65, are given as examples of binders that are cross-linked to insolubilize them in the coating.

Irihara et al. describes a process involving two ink jet inks, a slow drying black ink and a fast drying white ink. The medium is paper and the white ink is ink jetted to produce an undercoat for the black ink just where it is imaged. Since the independent claim from which this claim depends has already been distinguished from the prior art, it is believed that this claims is also patentable.

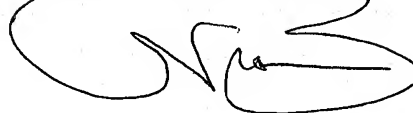
CONCLUSION

Dependent claims not specifically addressed add additional limitations to the independent claims, which have been distinguished from the prior art and are therefore also patentable.

In conclusion, none of the prior art cited by the Office Action discloses the limitations of the claims of the present invention, either individually or in combination. Therefore, it is believed that the claims are allowable.

If the Examiner is of the opinion that additional modifications to the claims are necessary to place the application in condition for allowance, he is invited to contact Applicant's attorney at the number listed below for a telephone interview and Examiner's amendment.

Respectfully submitted,



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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.